Leyden,[1] who relates two cases of apparent recovery from that condition.

The sole criterion of malignancy in cases of endocarditis is their fatal termination after an acute febrile attack, which may be intermittent, continuous, or, as in the case just reported, recurrent or relapsing.

COMPARATIVE ACTION OF THE GREEN AND BROWN STROPHANTHUS SEEDS.

By Henry H. Rusby, M.D.,
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The Committee on Research of the American Medical Association in 1897 instituted a comparative investigation of the green and brown strophanthus seeds, work in the different departments being undertaken by different investigators. Dr. Franz Pfaff, of the Harvard Physiological Laboratory, undertook an investigation of their physiological action, which was carried out by his assistant, Dr. M. P. O. Vejux-Tyrode. The complete reports of these experiments are but now ready for publication, and are presented herewith.

Perfect specimens of the two seeds were carefully selected by myself and 5 per cent. tinctures of them prepared. These tinctures were marked " A " and " B," respectively, and were thus supplied to Dr. Pfaff without any further knowledge on his part of their identity. In the report entitled " First Report " these are referred to only as " A " and " B." Through an accident in transportation, the key to the application of these letters was lost, so that it was not certainly known which referred to the green and which to the brown seeds. Fresh lots of seeds were therefore selected, tinctures made as before, and the experiments repeated as detailed in the report entitled " Second Report." Dr. Tyrode recognized the tincture of the green seeds as corresponding to " A " in the first report, that of the brown to " B."

It will be seen that the results of these experiments prove the existence in strophanthus seeds of two distinct principles, one of which may be referred to as the " toxic principle," the other as the " cardiant principle." That they are distinct principles is clear, as the two seeds exhibit the two properties in opposite rather than in parallel degrees.

These two properties have not been definitely located in the different constituents. When this shall have been done it may enable us to devise preparations which will represent the one and eliminate the other.

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[1] Ueber intermittirendes Fieber und Endocarditis. Zeitschrift für klin. Med., 1882, No. 4.

There can be little doubt remaining that the two plants yielding these seeds are specifically distinct—that is, the one is not a mere variety of the other.

Lastly, if the conclusion is correct that "A" represents the green and "B" the brown seeds, it follows that the green seeds, or those of S. Kombé Oliver, should alone be specified and described in the *Pharmacopœia.*

COMPARISON OF TWO SOLUTIONS OF STROPHANTHUS.[1]

First Report. By Dr. Maurice P. O. Vejux-Tyrode.

Dr. H. H. Rusby, on behalf of the Committee on Research of the American Medical Association for 1897, has submitted for comparative examination two alcoholic solutions of different seeds of strophanthus, namely, the green and the brown, which were prepared in the same manner.

These two solutions (marked "A" and "B") are of a pale straw-color, the color of solution "A" being slightly deeper than that of solution "B." Both become opalescent when mixed with water.

As strophanthus is a heart poison, my efforts toward making a comparison were directed to the circulation, which was studied mainly by means of blood-pressure experiments.

The following series of experiments was performed upon rabbits, which were prepared for this purpose by being deprived of food for twenty-four hours. Before the experiments they were narcotized with seven decigrams of chloral per kilogram of body-weight. By means of a canula the carotid was connected with a mercury manometer, which recorded the blood-pressure upon the kymograph. The drug was introduced into the circulation by injection into the jugular vein. Curves were taken about every five minutes. The measurement of the pressure in the table of experiments is given for every quarter of an hour.

I performed fifteen experiments on blood-pressure; eight of these were done with solution "A," while the seven others were done with solution "B." Since the results of all these experiments do not materially differ, I shall cite but four instances. The first two were performed with solution "A," diluted ten times; the last two with solution "B," diluted in Experiment 3 ten times, and in the other experiment twenty times. It was found necessary to make this dilution so that the drug might not reach the heart in too concentrated a form, and also to avoid the irritating effect of the alcohol.

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[1] The writer wishes to express his sincere thanks to Dr. Franz Pfaff, Instructor in Pharmacology at the Harvard Medical School, under whose direction this work was done, for many valuable suggestions and for kind and careful criticism.

EXPERIMENT I. With solution " A," diluted ten times. December 1, 1897. Rabbit weighed 198 grammes. At 10 A.M. received one grain of chloral in 50 c.c. aqua per os. Operation began at 12.10; operation finished at 12.45. Canulas in carotid artery and in jugular vein.

Time. P.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
12.15—1.15	48	
1.15—1.30	50—64	1.20. Injected ½ c.c. dilute strophanthus.
1.30—1.45	70—76	1.45. Injected ⅓ c c. dilute strophanthus.
1.45—2.00	80—86	1.55. Injected ⅓ c.c. dilute strophanthus.
2.00—2.15	88	2.12. Injected ⅓ c.c. dilute strophanthus.
2.15—2.30	88—92	2.25. Injected ½ c.c. dilute strophanthus.
2.30—2.45	92	2.40. Injected ⅓ c.c. dilute strophanthus.
2.45—3.00	92	3.00. Pulse quite irregular.
3.00—3.15	88	3.05. Injected ⅓ c.c. dilute strophanthus. 3.6—3.20. Clot removed from carotid.
3.15—3.30	110	3.25—3.30. Another clot removed. Pulse curve continued irregular until death.
3.30—3.45		
3.45—4.7	104	4.7. Animal died.

EXPERIMENT II. With solution " A," diluted ten times. December 8, 1897. Rabbit weighed 2220 grammes. At 9.30 A.M. received 1.55 grammes of chloral in 50 c.c. aqua per os. Operation begun at 10; operation terminated at 10.30. Canulas in carotid artery and in jugular vein.

Time. A.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
10.40—10.55	52—54	
10.55—11.10	52—54	11.5. Injected ⅓ c.c. dilute strophanthus.
11.10—11.25	54—60	11.16. Injected ⅓ c.c. dilute strophanthus.
		11.24. Injected ⅓ c.c. dilute strophanthus.
11.25—11.40	62—66	
11.40—11.55	60	11 52. Injected ⅓ c.c. dilute strophanthus.
11.55—12.10	62—68	12.5. Injected ⅓ c.c. dilute strophanthus.
12.10—12.25	68—74	
12.25—12.40	....	Clot removed from carotid.
12.40—12.55		
12.55— 1.10	56—60	1.2. Injected ⅓ c.c. dilute strophanthus.
1.10— 1.25	60—78	1.13. Injected ⅔ c.c. dilute strophanthus.
1.25— 1.40	82	
1.40— 1.55	80—84	1.41. Injected ½ c.c. dilute strophanthus.
1.55— 2.10	84—98	1.58. Injected ½ c.c. dilute strophanthus.
		2.3—2.25. Pulse curve irregular.
2.10— 2.25	98—100	2.15. Clot removed from carotid.
2.25— 2.40	....	2.35. Prepared other carotid.
2.40— 2.55	62—84	
2.55— 3.10	82—94	
3.10— 3.25	60—70	3.20. Injected ½ c.c. dilute strophanthus.
		3.17—3.27. Quite regular beat, large pulse curve.
3.25— 3.38	72	3.34. Injected ½ c.c. dilute strophanthus.
		3.38. Animal died.

EXPERIMENT III. With solution " B," diluted ten times. January 3, 1898. Rabbit weighed 1890 grammes. At 12 M. received 1.32 grammes of chloral in 50 c.c. aqua per os. Operation begun at 12.50; operation finished at 1.20. Canulas in carotid artery and in jugular vein.

Time. P.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
1.55—2.10	48—72	
2.10—2.15	70—72	2.12. Injected $\frac{1}{10}$ c.c. dilute strophanthus.
2.15—2.30	70	2.23. Injected $\frac{1}{3}$ c.c. dilute strophanthus.
2.30—2.45	....	Clot removed from carotid.
2.45—3.00	82—86	3.00. Injected $\frac{1}{10}$ c.c. dilute strophanthus. Pulse curve irregular.
3.00—3.15	66—76	
3.15—3.30	78—86	3.25—3.30. Clot removed from carotid.
3.30—3.45	72	3.45. Injected $\frac{1}{10}$ c.c. dilute strophanthus.
3.45—4.00	68	3.45—4.55. Pulse curve irregular.
4.00—4.15	58—62	
4.15—4.30	46	4.30. Injected $\frac{1}{3}$ c.c. dilute strophanthus. Pulse curve very irregular.
4.30—4.55	46	4.50. Injected $\frac{1}{10}$ c.c. dilute strophanthus.
		4.55. Animal died.

EXPERIMENT IV. With solution "B," diluted twenty times. January 12, 1898. Rabbit weighed 1900 grammes. At 9.15 A.M. received 1.33 grains of chloral in 50 c.c. of aqua per os. Operation begun at 10; operation finished at 10.20. Canulas in carotid artery and in jugular vein.

Time. A.M.	*Blood pressure in mm. of Hg.*	*Remarks.*
10.25—10.40	76— 86	
10.40—11.00	76— 88	10.40. Injected $\frac{1}{3}$ c.c. dilute strophanthus.
		10.55. Injected $\frac{1}{3}$ c.c. dilute strophanthus.
11.00—11.15	88— 98	11.8. Injected $\frac{1}{3}$ c.c. dilute strophanthus.
11.15—11.30	90—100	11.30. Injected $\frac{1}{5}$ c.c. dilute strophanthus.
11.30—11.45	86— 90	11.40. Injected $\frac{1}{5}$ c.c. dilute strophanthus.
11.45—12.00	58— 86	11.52. Injected $\frac{2}{5}$ c.c. dilute strophanthus.
		11.55—1.00. Pulse curve quite irregular.
12.00—12.15	68— 84	
12.15—12.30	44— 70	12.25. Injected $\frac{1}{5}$ c.c. dilute strophanthus.
12.30—12.45	60— 68	12.42. Injected $\frac{1}{3}$ c.c. dilute strophanthus.
12.45— 1.00	66	1.00. Animal died.

RÉSUMÉ OF THE FOREGOING EXPERIMENTS

Number of experiments.	Average blood pressure in mm. of Hg before injection of stroph.	Average blood pressure in mm. of Hg from first injection of stroph. to the maximum rise.	Difference between the two in mm. of Hg.	Time between the two.	Amount of diluted drug injected.
Sol. A. I.	50.8	83.34	35.54	2 hrs. 15 min.	2.33 c.c.
" II.	51.6	67.8	16.2	3 " 10 "	4.00 "
Sol. B. III.	61.32	77.6	16.28	1 " 10 "	0.53 "
" IV.	77	87.2	10.2	0 " 35 "	1.00 "

While performing the blood-pressure experiments I noticed a marked difference in the degree of toxic properties between the two solutions. The quantity of drug which could be injected before the death of the animal seemed notably greater when solution "A" was used.

To determine the difference in toxicity between the two solutions, experiments were made upon frogs. The usual method of preparing the frogs for heart experiments was adopted. The drug was introduced into the dorsal lymph-sacs.

Below is a table showing the results of these experiments:

STROPHANTHUS A.

I. Frog weighed 45 grammes.

Time.	*Heart beat per min.*	*Remarks.*
5.12 P.M.	70	5.15. Injected 0.025 in 0.2 aq.
5.35	44	
5.50	18	
6.10	0	6.10. Heart stopped. Total injection 0.025
		II. Frog weighed 35 grammes.
11.40 A.M.	52	12.5. Injected 0.01 in 0.2 aq.
12.10	48	12.15. Injected 0.005 in 0.1 aq.
12.35	27	
12.50	0	12.50. Heart stopped. Total injection 0.015.
		III. Frog weighed 65 grammes.
2.20 P.M.	76	2.35. Injected 0.01 in 0.2 aq.
2.45	71	
3.15	59	3.32. Injected 0.005 in 0.1 aq.
3.45	48	
4.15	29	Heart very weak.
4.50	18	
5.12	0	Heart stopped. Total injection 0.015.
		IV. Frog weighed 70 grammes.
		12.45. Injected 0.01 in 0.2 aq.
1.00 P.M.	60	
1.30	53	1.45. Injected 0.005 in 0.1 aq.
2.00	52	
2.30	44	2.40. Injected 0.005 in 0.1 aq.
3.5	27	
3.15	0	Heart stopped. Total injection 0.02 c.c.
		V. Frog weighed 60 grammes.
4.20 P.M.	89	4.25. Injected 0.01 in 0.2 aq. After total injection 0.01 heart did not stop in two hours.
4.55	72	
5.25	58	
5.55	43	
6.28	48	Heart strong and regular. Experiment discontinued.

STROPHANTHUS B.

VI. Frog weighed 60 grammmes.

8.15 A.M.	82	8.25. Injected 0.005 in 0.1 aq.
8.45	69	8.45. Injected 0.0025 in 0.05 in aq.
9.15	72	
9.45	53	
10.15	20	10.5. Ventricle almost non-contractile.
10.35	0	Heart stopped. Total injection 0.0075.
		VII. Frog weighed 60 grammes.
9.25 A.M.	82	9.28. Injected 0.005 in 0.1 aq.
9.45	78	
10.25	34	
10.50	44	11.15. Injected 0.0025 in 0.05 aq.
12.35	16	12.35. Injected 0.00125 in 0.025 aq.
12.55	0	Heart stopped. Total injection 0.00875.

Time.	*Heart beat per min.*	*Remarks.*
		VIII. Frog weighed 70 grammes.
3.00 P.M.	62	3.15. Injected 0.005 in 0.1 aq.
3.30	68	
4.00	52	
4.35	46	4.40. Injected 0.0025 in 0.05 aq. Marked peristalsis of heart.
5.00	42	
5.30	44	5.45. Injected 0.00125 in 0.025 aq.
6.00	40	6.35. Injected 0.00125 in 0.025 aq.
6.40	18	
7.5	0	Heart stopped. Total injection 0.01.
		IX. Frog weighed 60 grammes.
3.00 P.M.	74	3.15. Injected 0.005 in 0.1 aq.
3.30	64	
4.00	64	4.25. Injected 0.0025 in 0.5 aq.
4.30	64	
5.00	30	5.10. Injected 0.00125 in 0.025 aq.
5.30	32	5.45. Injected 0.00125 in 0.025 aq.
6.00	52	6.15. Injected 0.00125 in 0.025 aq.
6.30	34	
6.45	0	Heart stopped. Total injection 0.01125.
		X. Frog weighed 50 grammes.
9.25 A.M.	76	9.30. Injected 0.0075 in 0.15 aq.
10.00	60	
10.30	30	11.00. Marked peristalsis of heart.
11.00	58	11.8. Injected 0.00125 in 0.025 aq.
11.25	54	Heart irregular and intermittent.
12.00	48	
12.30	0	12.30. Heart stopped. Total injection 0.00875,
		XI. Frog weighed 55 grammes.
9.20 A.M.	60	9.30. Injected 0.0075 in 0.15 aq.
10.00	68	
10.35	50	
11.00	36	
11.35	8	
12.00	0	Heart stopped. Total injection 0.0075.

In the four typical experiments on blood-pressure (see Experiments I., II., III., IV.) one can see that the highest blood-pressure after the injections of solution "B" is about one-half as great as the maximum blood-pressure obtained with solution "A."

Naturally, with the same solution there is a certain range of variation in the height of the blood-pressure for different animals.

If we take an average of the height of the blood-pressure in the experiments with solution "A" and solution "B" we find that with solution "A" the average is about twice as great as that with solution "B."

As regards the difference in toxic power, the few experiments upon frogs show that with solution "A" the heart was stopped after a minimum toxic dose of 0.015 c.c. and a maximum dose of 0.025 c.c. The minimum toxic dose of solution "B" is 0.0075 c.c., while the maximum is 0.01125 c.c.

I conclude from the experiments done that both solutions are active in raising the blood-pressure, and in toxic doses cause the frog's heart to stop; that solution "B" is twice as toxic as solution "A"; that solution "A," although it requires a little more of the drug, gives a longer, higher, and more constant rise of blood-pressure.

Second Report. No. 1 Experiment with Green Seeds. December 6, 1898.

Rabbit weighed 2090 grammes. Narcotized with 0.7 grammes of chloral hydrate per kilo weight. Canula in carotid and in jugular.

Time.	*Blood pressure in mm. of Hg.*	*Remarks.*
9.55—10.5	76—70	
10.5 —10.15	82—80	10.5. Injected ⅓ c.c. (tinct. stroph. diluted ten times).
10.15—10.30	76	10.25. Cleaned out carotid. 10.32. Injected ⅓ c.c.
10.30—10.55	76—86	10.40. Prepared other carotid.
10.55—11.5	76—86	10 55. Injected rest of 1st c.c. 11.7. Injected ⅓ 2d c.c.
11. 5—11.15	80	11.15. Injected ⅓ 2d c.c.
11.15—11.30	84—92	
11.30—11.45	78—86	11.35. Injected rest of 2d c.c.
11.45—12.00	82	11.55. Injected ½ 3d c.c.
12.00—12.15	82—84	12.15. Injected ¼ 3d c.c.
12.15—12.30	84—92	
12.30—12.45	92—112	12.30. Injected rest of 3d c.c.
12.45— 1.00	60—68	12.45. Injected ¼ 4th c.c.
1.00— 1.15	60—82	
1.15— 1.30	96—170	
1.35	102	1.35. Killed the animal.

No. 2 Experiment with Brown Seeds. December 8, 1898.

Rabbit weighed 2130 grammes. Narcotized with 0.7 grammes of chloral hydrate per kilo weight. Canula in carotid and in jugular.

Time.	*Blood pressure in mm. of Hg.*	*Remarks.*
12.5 —12.25	88—102	
12.25—12.55	104—110	12.27. Injected ⅓ c.c. (tinct. stroph. diluted ten times).
12.55— 1.15	118—128	12 35. Injected ⅓ 1st c.c.
1.15— 1.30	86—128	12.50. Injected ¼ 1st c.c. 1.20. Injected ⅓ 2d c.c.
1.30 – 1.45	86—114	
1.45— 2.00	84	1.55. Injected ⅓ 2d c.c.
2 00— 2.15	74—84	
2.30— 2.40	70	2.50. Animal died.

CRITICAL SUMMARY OF LITERATURE

ON

TUBERCULOSIS OF THE WALLS OF THE BLOODVESSELS AND THE PRODUCTION OF MILIARY TUBERCULOSIS.[1]

By Harvey R. Gaylord, M.D.,
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The younger men of this generation can have but an inadequate appreciation of the difficulties which were overcome by those pioneers to whose work we to-day owe our clear and satisfactory understanding of the mechanism involved in the production of miliary tuberculosis. The reason why the problem was one of such difficulty was owing to the fact that through the teachings of Rokitansky and Virchow the walls of the bloodvessels were supposed to be immune to tuberculous infection. Besides this difficulty it must be remembered that in those days, in which the very dawn of knowledge regarding tuberculosis had begun to break, the so-called caseous inflammation and caseous hyperplasia were not considered to have the most remote relation to tuberculosis. The first ray of light upon the subject came when Buehl and Dietrich propounded the doctrine that tuberculosis was produced by infection from without, and that this infection or poison, being carried into the bloodvessels, produced the miliary and subacute dissemination of the process. They further made the observation that in every case of general miliary tuberculosis somewhere in the body an older focus of caseous degeneration was to be found. Investigation following upon the Buehl-Dietrich doctrine did not confirm in full this observation, for in many cases it was impossible for the pathologist to locate the primary focus of the infection. Owing to the then current doctrine of Rokitansky, that the bloodvessels themselves were never the seat of infection, pathologists paid but slight attention to this field. True, Sir Astley Cooper had described in 1798 the existence of tuberculous infection of the ductus thoracicus. But this had been forgotten, and was only recalled, when nearly one hundred years afterward, Ponfic, at the Munich Natural Science convention of 1877, described his observations of cases of a similar nature. Ponfic saw no connection between the tuberculous infection of the thoracic duct and the accompanying miliary tuberculosis, believing, in fact, that the infection of the thoracic duct was secondary.

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[1] Part of an address delivered at the quarterly meeting of the Buffalo Academy of Medicine, March 21, 1899.